Observations of Spencer's Skink *Pseudemoia spenceri* from within the high canopy of an overmature Mountain Ash *Eucalyptus regnans*

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Abstract
During March 2012, whilst undertaking an aerial survey of an overmature Mountain Ash *Eucalyptus regnans* in Toolangi State Forest, a Spencer's Skink *Pseudemoia spenceri* was observed in the canopy at a height of ~50 m above ground level. In the following year, whilst surveying another overmature *E. regnans*, a pair of *P. spenceri* was detected at similar height within the canopy. These sightings demonstrate that thermoregulation in *P. spenceri* is not restricted to dead trees and that high canopies of overmature trees may be an important component of its habitat. Due to the difficulty of accessing the forest canopy it is likely that our understanding of arboreal habitat use has been underestimated for small vertebrates such as skinks. Our serendipitous sightings emphasise the need for further research in this area. (*The Victorian Naturalist* **131** (1) 2014, 24-27)

Keywords: Spencer's Skink *Pseudemoia spenceri*, Mountain Ash *Eucalyptus regnans*, arboreal, canopy

Introduction

Spencer's Skink *Pseudemoia spenceri* is an insectivorous species found in wet sclerophyll forest (Rawlinson 1974) and montane dry woodland (Clemann 2002). With well developed five-toed (pentadactyl) limbs, dorsoventral flattening and high agility, *P. spenceri* is the most arboreally adapted of south-eastern Australian scincids (Brown 1986). The use of aerial tree microhabitats provides opportunities for basking (Webb 1985; Brown and Nelson 1993), foraging (Brown 1986), shelter (Rawlinson 1974; Gibbons and Lindenmayer 2002) and predator avoidance. Previous records of the vertical extent of live tree use by *P. spenceri* are 10 m (Pengilley 1972 cited in Webb 1985), 22 m (Brown and Nelson 1993) and 15 m (Homan 2011) above ground level. Rawlinson (1974) documented the use of aerial microhabitats 50-75 m above ground level but believed *P. spenceri* to be restricted to dead trees and primarily associated with post-fire stands in wet sclerophyll forest. The validity of Rawlinson's report was questioned (Webb 1985) and as additional observations of *P. spenceri* at this height have not been documented it remained unclear to what extent this and other species may use the forest canopy in temperate south-eastern Australia.

Observations of Spencer's Skink

In March 2012, as part of an ongoing project to document Victoria's largest trees (Mifsud 2003), a Mountain Ash *Eucalyptus regnans* 73 m in height and 245.5 m^3 trunk volume (Mifsud 2012 unpubl. data) was climbed with the use of arboricultural methods (Dial and Carl 1994) in Toolangi state forest (37° 33' 59S 11" S, 145° 27' 47.43" E). The tree was overmature with a broken top, which is characteristic of this growth stage (Ashton 1975). Using records of stand replacing fires in the area as a dating method (Ashton 2000), the tree was estimated to be ~400 years of age. The tree was located within an area of wet sclerophyll forest characterised by an overstorey of *E. regnans*, a midstorey tree layer of Blackwood *Acacia melanoxylon*, Silver Wattle *Acacia dealbata*, Myrtle Beech *Nothofagus cunninghamii* and a tall shrub layer of Soft Tree-fern *Dicksonia antarctica*, Rough Tree-fern *Cyathea australis* and Musk Daisy-bush *Olearia argophylla* (Costermans 1983). During this survey, a skink was observed within the canopy at a height of ~50 m above ground level. This individual did not exhibit an evasive response and actively climbed onto the legs and body of the surveyor (Fig. 1). On 23 March 2013, during the survey of another overmature *E. regnans*,

Fig. 1. Spencer's Skink on the leg-strap of a surveyor's harness. Photo by Mike Hanuschik.

65 m in height and 170 m^3 trunk volume (Mifsud 2013 *unpubl. data*) and also in Toolangi State Forest, a pair of *P. spenceri* was observed at a height of 50 m above ground level. One individual was basking in a sunspot on the trunk (height 55 m) and the other was stationary on a dead limb below the first. Neither individual exhibited an evasive response or changed positions as we ascended adjacent to their locations. The individual that had been basking proceeded to climb onto the body of a surveyor, remaining mainly stationary with periodic shuttling between the surveyor's arm, shoulder and back for a period of 15 minutes before being coaxed to return to the tree trunk (Fig. 2 and 3). With the exception of the aforementioned encouragement to leave the surveyor's body there was no handling or intentional interaction with the animals. A dark brown-olive colouration with golden-cream dorsolateral stripes, which are diagnostic characteristics of *P. spenceri* (Cogger 2000; Wilson and Swan 2010) were present in the observed animals.

Discussion

Pseudemoia spenceri forages on the forest floor and in aerial tree habitats with detritivorous insects such as saprophagous flies (Diptera), cockroaches (Blattodea) and termites (Isoptera) forming a significant component (40.7% within sample, n=82) of its diet (Brown 1986). Observations of ground based habitat use (≤1.2 m above ground level) recorded logs as the most commonly occupied substrate (78% of observations) with the majority (96%) of these being partly decayed (Webb 1985). As substrate use is often associated with prey capture it can be inferred that decaying coarse wood may provide important foraging opportunities at ground level; however, gut content analysis by Brown (1986) indicates that arboreal invertebrate prey obtained from aerial tree foraging also form a major proportion (52.3% within sample, n=82) of the diet of *P. spenceri*. Goldingay *et al.* (1996) noted a greater abundance of *P. spenceri* with an increase in log density following timber harvesting and an absence of *P. spenceri* in un-

Fig. 2. Spencer's Skink on the arm of a surveyor. Photo by Damien Navaud.

logged dry forest plots. This suggests that deadwood with environmental moisture conditions conducive to the establishment of wood decay and associated saprophagous invertebrate communities could be a critical resource for *P. spenceri*. In addition to the quantity of dead organic material (logs and litter) the level of insolation is an important influence on patterns of habitat usage in skinks within sclerophyll forests (Kutt 1999).

Climbing emergent trees to rise above understorey vegetation and thereby gain access to direct sunlight for thermoregulation, may be a driver of arboreal behaviour (Rawlinson 1975; Webb 1985; Kutt 1999). This hypothesis is supported by the findings of Brown and Nelson (1993), who noted the absence of *P. spenceri* at ground level in the successional stages of wet sclerophyll forest with the densest canopy cover (11–63 years old). At the scale of an individual overmature *E. regnans* the isobilateral leaf shape allows high levels of light penetration through the canopy (Keith *et al.* 2009), allowing insolation of the trunk. It has been suggested that sufficient light reaches the smooth bark to allow it to function as a photosynthetic organ (Sillett *et al.* 2010). The sightings reported here of *P. spenceri* basking on the smooth *E. regnans* bark supports the proposition that for an agile heliotherm such as *P. spenceri*, the level of insolation received on a live overmature *E. regnans* stem is likely to be sufficient for basking and suggests that thermoregulation is not restricted to dead trees.

Both elevation above the understorey and the presence of aerial deadwood are defining characteristics of overmature *E. regnans* (Ashton 1975; Mifsud 2003), and our observations suggest that these trees may provide an important combination of resources for *P. spenceri*. The availability of these resources (aerial deadwood and elevation for insolation) provided by living *E. regnans* are likely to remain longer than post-fire stags which are more disposed to structural collapse (Gibbons and Lindenmayer 2002), thus allowing *P. spenceri* populations to use old growth forest. This hypothesis is supported by the findings of Kutt (1999) who recorded a significantly greater abundance of *P. spenceri* in mature growth compared to 25–35 year old

Fig. 3. Spencer's Skink on the arm of a surveyor. Photo by Damien Navaud.

regrowth stands. Documenting the use of living overmature trees by *P. spenceri* is important to the management of this species in relation to forestry practices as retention of individual overmature *E. regnans* may have significant influence on their distribution. Whilst not listed as a threatened species, these findings also provide further evidence of the importance of old-growth forest for maintaining forest fauna.

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